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PALMER AMARANTH THAT RESISTS 2,4-D AND DICAMBA CONFIRMED IN KANSAS

**THIS IS THE FIRST CONFIRMED CASE OF GROUP 4
HERBICIDE RESISTANCE IN PALMER AMARANTH.**

By Kansas State University
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population that resists the synthetic auxin (Group 4) herbicides dicamba and 2,4-D. New formulations of dicamba and 2,4-D are used on soybeans in the Roundup Ready Xtend System and the Enlist Weed Control System.

The resistant population was collected from a long-term conservation tillage study at the KSU Agronomy Ashland Bottoms Experiment Field in southern Riley County in northeastern Kansas. This is the first confirmed case of resistance to dicamba and 2,4-D in Palmer amaranth, further magnifying the challenge to manage this weed in conservation tillage systems, noted KSU weed scientists Dallas Peterson, KSU Extension weed specialist and Extension agronomy state leader; Mithila Jugulam, KSU weed physiology professor; Chandrima Shyam, KSU weed science graduate student; and Ednaldo Borgato, KSU weed science graduate student. The KSU weed scientists compiled this report outlining the 2,4-D and dicamba resistance.

ONE TOUGH CUSTOMER

Palmer amaranth is one of the most economically damaging and difficult-to-control broadleaf weeds across the U.S. Previously, Palmer amaranth in Kansas resisted the following herbicide sites of action:

- **Group 2 (ALS)**
- **Group 5 (atrazine)**
- **Group 9 (glyphosate)**
- **Group 27 (HPPD inhibitors like mesotrione (Callisto), Huskie, Laudis, Impact, and Armezon herbicides.)**

The KSU scientists note this has left farmers with few postemergence options to manage this weed. Dicamba and 2,4-D (Group 4) have been used for many years to help control Palmer amaranth, but farmers have complained about poor control in recent years.

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Using this progeny, a 2,4-D dose-response study was conducted to understand the level of resistance in the suspected resistant population relative to two known 2,4-D-susceptible populations. Results at 21 days after 2,4-D application showed the resistant progeny survived up to a 16X (8 lb. ae per acre dose of 2,4-D, while susceptible plants were completely killed with 1 pound ae per acre or less. This population exhibits about 8- to 10-fold resistance to 2,4-D.

The progeny of the same seed referenced above were also treated with a field-recommended rate of dicamba (0.5 pounds ae per acre) and showed a high rate of survival (81%), while the susceptible populations were controlled. Cross-resistance to different herbicides in Group 4 herbicides has been reported in many other weeds. Experiments are in progress to determine the level of resistance to dicamba and other Group 4 herbicides.

GROUP 27 RESISTANCE

Besides Group 4 herbicide resistance, herbicides, preliminary research also indicates that this Palmer amaranth population survived application of Group 27 (3 ounce per acre Callisto) and Group 14 (10 ounces per acre Cobra) herbicides. Although resistance to Group 27 herbicides in Palmer amaranth is increasing in Kansas, this

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population that was completely controlled. Although Group 14 herbicides can be effective in controlling pigweeds, thorough coverage on small weeds is essential for good control.

We strongly suspect this population of Palmer amaranth is also resistant to atrazine (Group 5), glyphosate (Group 9, ALS herbicides (Group 2, Pursuit and Scepter), and perhaps s-metolachlor (Group 15, Dual Magnum) based upon field observations. Additional research will be conducted to further determine the extent of herbicide resistance in the Palmer amaranth.

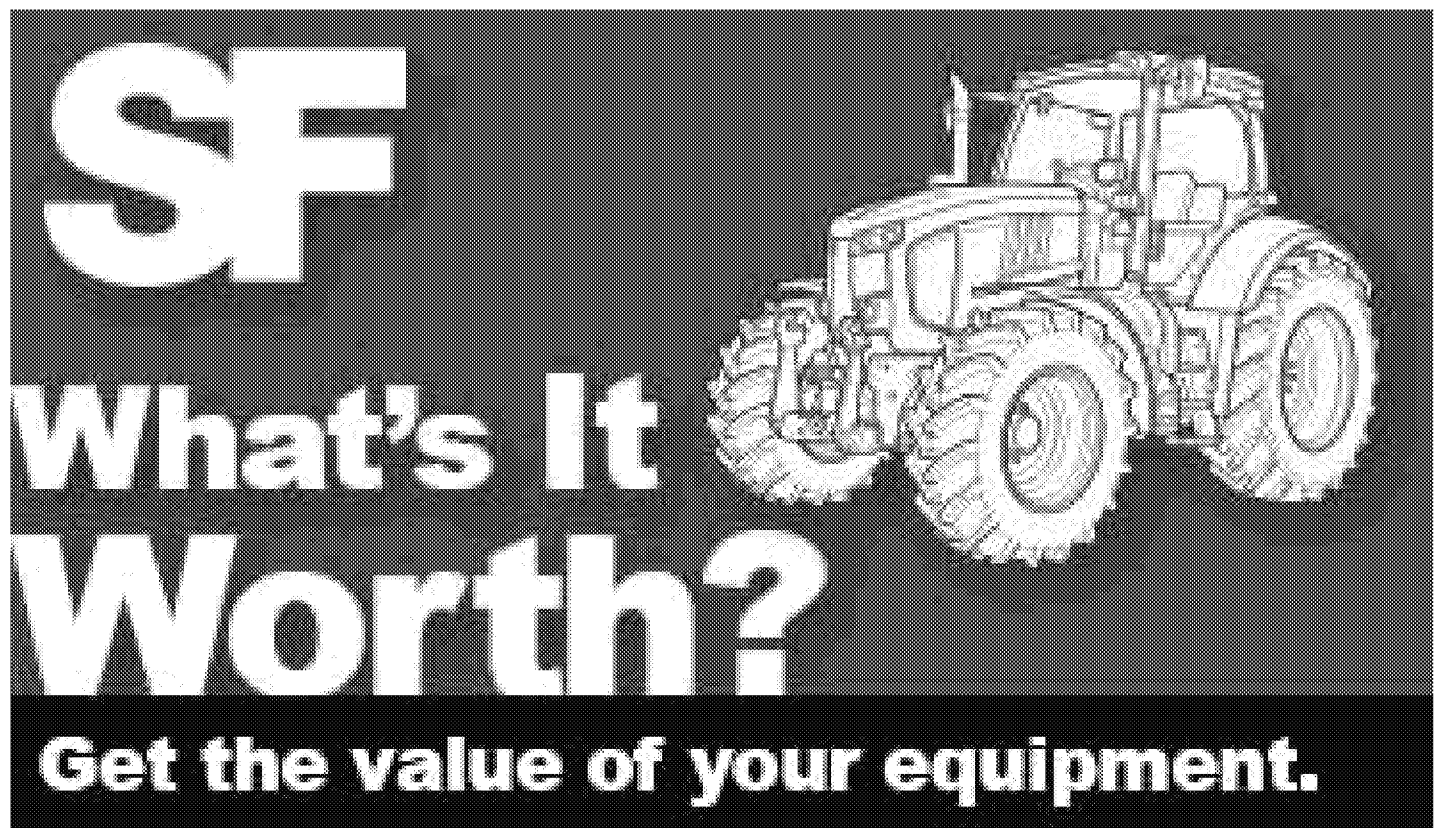
This population of Palmer amaranth was found in a long-term conservation tillage experiment initiated over 45 years ago to compare different tillage systems and crop rotations. Palmer amaranth became increasingly difficult to control, especially in the continuous no-till grain sorghum systems.

The plots were exposed to repeated use of herbicides labeled for grain sorghum, including Group 5, 9, 14, 15, and 27 herbicides. These herbicides are known to be excellent options to control broadleaf species. Likewise, the adjacent plots were continuous no-till soybeans, with similar repeated herbicide programs in soybeans.

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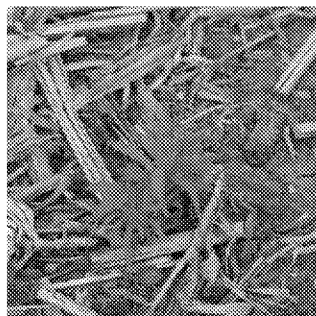


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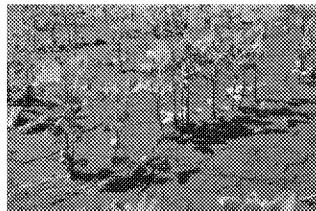
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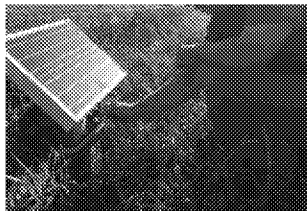
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